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AMERICAN TRICHOPTERA—NOTES AND DESCRIPTIONS.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

In the following pages are descriptions of various new caddiceflies, mostly from my own collection. I have given a new arrangement of the genera of the Hydropsychidæ based on a salient, but hitherto unused character, which makes the classification of this family easier than before.

PHRYGANEIDÆ.

Neuronia smithi, n. sp. (Pl. VIII, fig. 11).

In general similar to *N. concatenata*, but the irrorations on the wing a little further apart, and much less wavy; the vertex wholly pale yellowish, the thoracic notum also pale, but rather dark each side. Venation generally as in *N. concatenata*, but the first fork does not reach half way back on discal cell (in *concatenata* much more than half way). The lower appendages of the male have the apical spine longer and less curved than in *N. concatenata*.

Expanse 23 mm.

From Lakehurst, N. J., 4th July (Englehart). Named in memory of the late Dr. J. B. Smith.

LIMNEPHILIDÆ.

Limnephilus spinatus, n. sp. (Pl. VIII, figs. 8, 9).

Palpi yellow; face dark, with yellow hairs, vertex and thorax dark, with some yellow hair and black bristles; antennæ brownish, the basal joints darker; abdomen black above and on the sides, vertex pale; legs yellow, with black spines, those on tibia 1 are very short; wings, except costal and subcostal areas, are brown, marked with pale spots, these most numerous in front and along the veins, basal part of apical cells pale, beyond the brown is densely spotted with minute pale dots, the usual median oblique mark is distinct; hind wings hyaline, venation yellowish. In the fore wings

the discal cell is no longer than the pedicel, and in hind wings the discal hardly reaches before the fork of the median.

Expanse 26 mm.

From Vineyard, Utah, 27th August (Spalding).

Limnephilus productus, n. sp. (Pl. X, figs. 29, 36).

Palpi yellowish brown, face brown, with much golden yellow hair, and some black bristles; vertex brown, with yellow hair and brown bristles; antennæ yellowish brown, basal joint darker; thorax with black bristles and yellow hair. Abdomen dull black, apex of segments paler; legs yellowish, spines black, those on tibia 1 very short. Wings mostly pale, but area behind median is dark brown, and more or less broken by pale spots, mostly along median vein, some dark spots along radius, longitudinal veins with dark streaks, a hyaline white mark on the thyridium and one on arculus; hind wings pale, with pale venation. In fore wings the discal cell barely reaches before the fork of median. In hind wings fork 5 is no longer than its pedicel, and in hind wings the discal cell begins a little before the posterior anastomosis.

Expanse 27 mm.

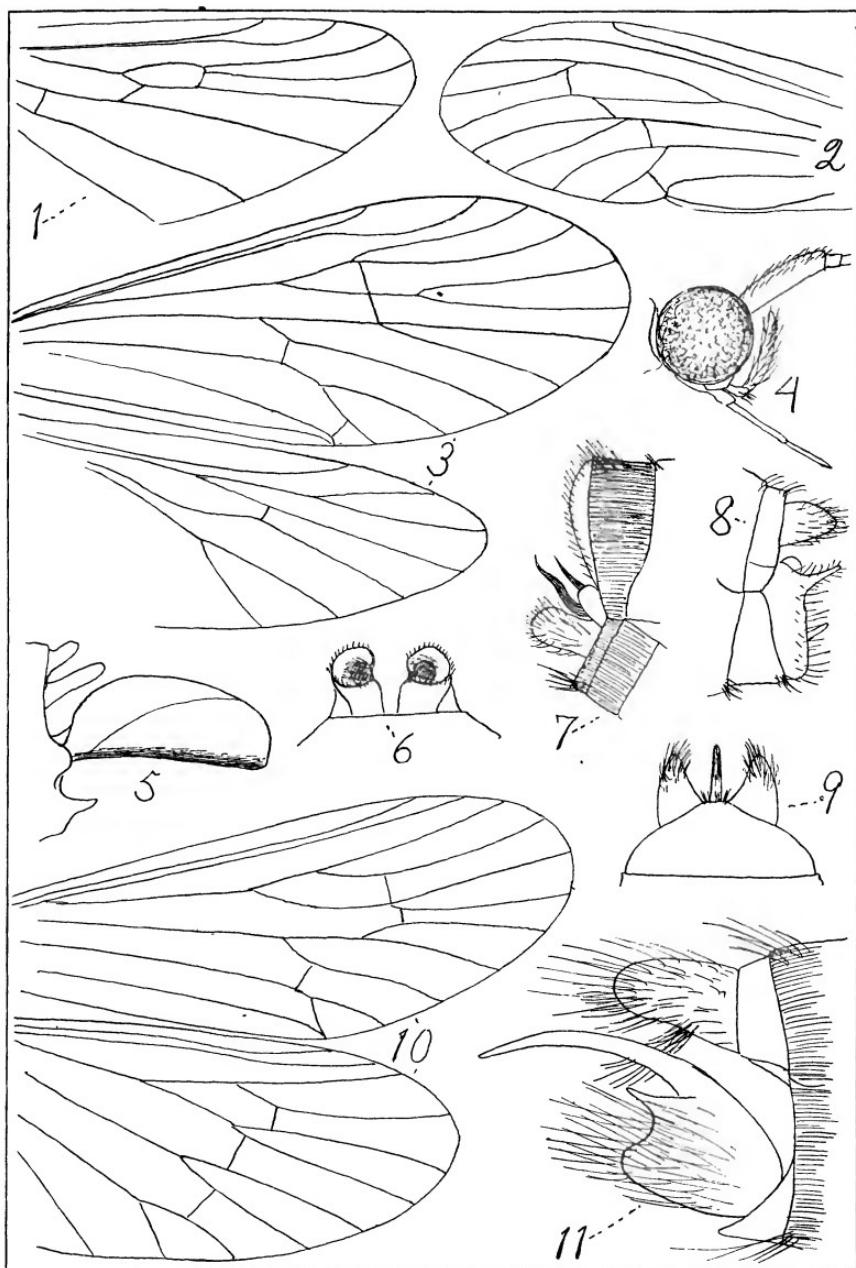
From Vineyard, Utah, 27th August, at sugar, (Spalding).

Limnephilus æqualis, n. sp. (Figs. 14, 31).

Palpi pale, very slender, face with yellow hair; vertex darker in front, pale behind, with gray hair, and dark bristles, thorax pale above, with yellowish hair; abdomen pale yellowish, tips of male genitalia black; legs yellowish, with black spines, those on tibia 1 as long as width of the joint. Wings mostly brownish behind, pale in front, costal area unmarked, the brown much broken up, the usual oblique median mark, large pale space below stigma, over base of apical cells, and just before the anastomosis, and extending outward over tips of the first and second subapical cells; few marks in the radial or discal areas, and base of wings is mostly pale; hind wings pale, venation, yellowish. In fore wings the discal cell is longer than its pedicel; in hind wings the discal reaches very much before the fork of median.

Expanse 25 mm.

From Bon Accord, British Columbia, 7th June, (Russell).



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Limnephilus secludens, n. sp. (Figs. 17, 27).

Palpi yellowish, very slender; face dark, with yellow hair; vertex and thorax dark, with yellowish hair and dark bristles; abdomen dull black above, venter pale; legs yellowish, spines black, tibia 1 with very short spines; wings mostly pale, but brownish behind and these faintly broken with pale, a blackish mark on thyridium; hind wings pale, venation yellowish. Fore wings with the discal cell longer than its pedicel; hind wings with discal cell hardly reaching before fork of median. The dark, median pieces of male genitalia are only visible from behind.

Expanse 20 mm.

From Penticton, British Columbia, 9th August (Wallis) and Saskatchewan, July.

Limnephilus argenteus, n. sp. (Fig. 13).

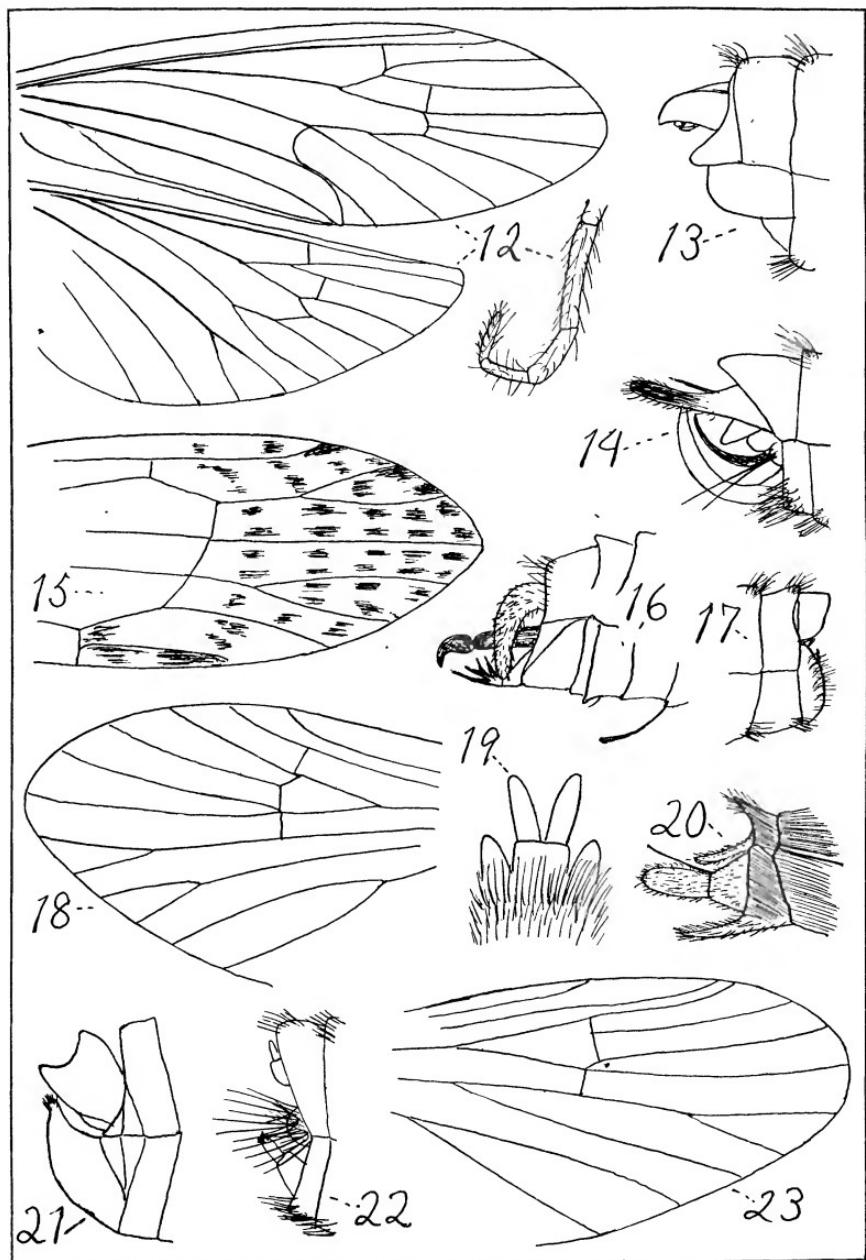
Palpi brownish, face brown with black bristles; vertex dark, pale behind; antennæ brownish, faintly annulate, thorax grayish brown, with black bristles and some white hairs near base of wings; abdomen black, tips of segments pale; legs pale yellowish, with black spines, no dark marks on tibiæ. Wings brown, densely guttated with silvery marks, large oblique spot near the middle, several near the thyridium and in base of first subapical cell, and near base, but not extreme base, of apical cells with silvery spots, smaller silvery spots all over the wing, costal area with brown marks. Venation as in *L. gravidus*; in hind wings the fourth apical cell is plainly narrower than the second, but not acute, the cross-vein from base of fork 5 up to upper median is much more convex basally, and the lower median more fractured than in *L. gravidus*. The pronotum is longer and more flat above than in that species. The hind wings are excised as in that species, and in *Colpotaulius*, but the shape of fore wings and general appearance more like *Limnephilus*.

Expanse 35 mm.

From Nipigon, Ont., 18th June (Walker).

Stenophylax hesperus, n. sp. (Figs. 6, 21).

Palpi yellowish; antennæ dark brown, black on basal joint, paler towards tip; face yellow, with black bristles; vertex yellow,



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with a large median black spot between ocelli and extending back, bristles black; pronotum pale, mesonotum brown, the mesothoracic strips pale, rest of thorax pale; abdomen pale brownish, yellowish below; legs yellowish, with black spines. Wings nearly uniform pale brownish, clothed with fine black hairs; venation pale, a hyaline white mark on thyridium, and also on arculus; hind wings pale grayish, rather darker on the costal tip; fore wings with the discal cell twice as long as the pedicel, fork 1 its width back on discal, fork 3 a little back of anastomosis, lower median not fractured at base of fork 5; the spot in the base of fork 2 is pale; in the hind wings fork 3 extends back farther than in the fore wings; the discal cell extends much before forking of median vein.

Expanse 47 mm.

From Departure Bay, Vancouver Island, British Columbia, 1st August (Walker).

***Stenophylax flavata*, n. sp. (Figs. 32, 33).**

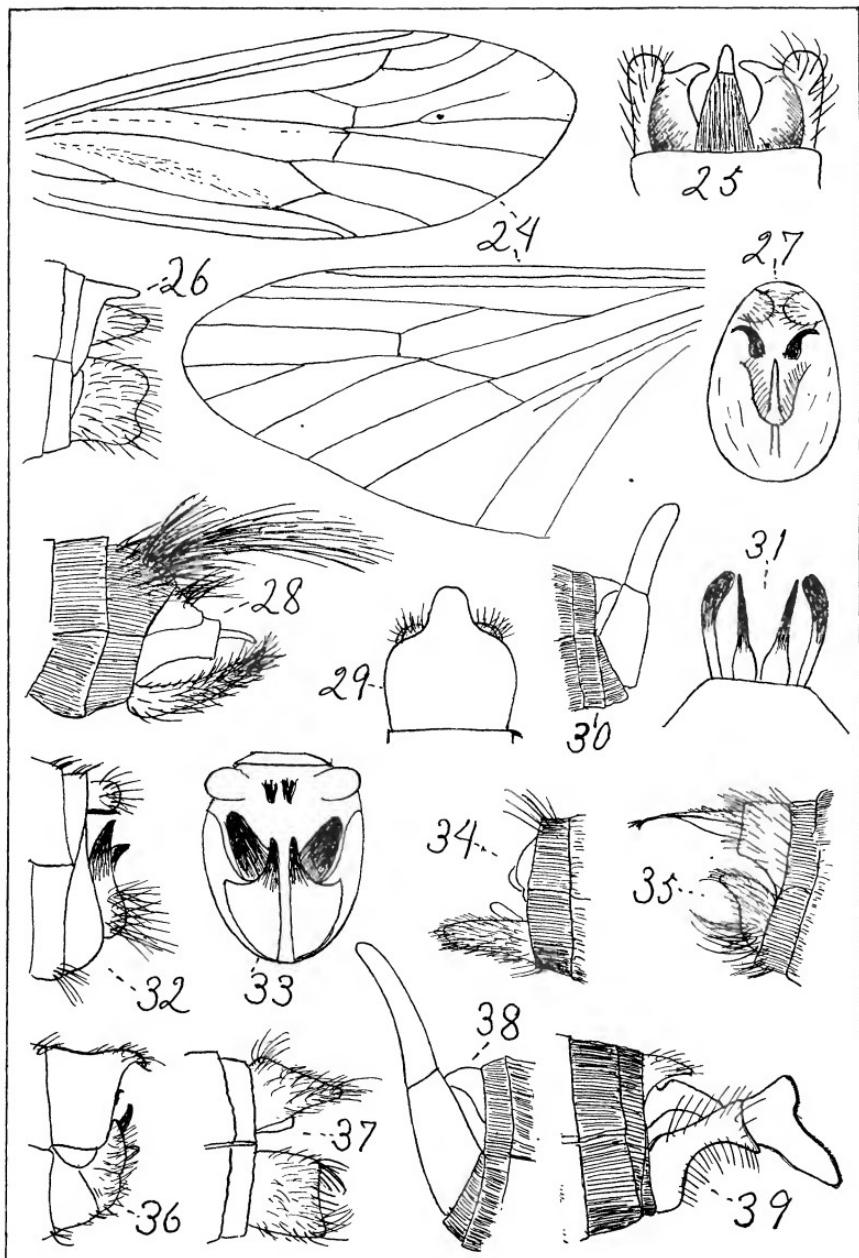
Yellowish with yellowish hair; palpi and antennæ yellowish; ocelli rather large, no ocellar macrochætae; legs yellow, spines black, tibia 1 densely spined to base, two stout spines at tip of femur 1; hind tibia of male curved; abdomen brown, the segments pale on tips. Wings uniformly pale yellowish, with yellowish veins and hair, tip of thyridial cell, and back to and lower anastomosis dark brown. In fore wings the discal cell is plainly longer than the pedicel, fork 1 nearly its width back on discal cell, fork 3 broad at base, lower median not fractured at base of fork 5; radius barely sinuate before stigma. Hind wings have forks 1 and 3, both more acute at base than in fore wings.

Expanse 40 mm.

From Pisgah Forest, N. Car., August. Resembles *Anisogamus divergens* Walk., but the male has not the black dorsal plate so characteristic of that species.

***Anisogamus infernalis*, n. sp. (Fig. 7).**

Palpi brown, yellowish on base of the second joint; head yellowish, darker on vertex; antennæ yellowish; basal joint blackish beneath posterior warts and pronotum with yellow hair, mesonotum with dark stripe each side, but tubercles in front of base of wings are pale, with golden hair; abdomen black, but pale on



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venter; legs pale yellowish, black on under side of first and second joints of tarsus I; spines black, and spurs yellowish. Leg I with very few spines, one at tip of femur, two or three on tibia, and small ones at tips of tarsal joints. Wings pale, the apical and posterior part brownish, with pale spots, larger pale spots beyond the anastomosis, anastomosis dark brown, membrane clothed with fine hairs. Costal area of fore wings rather broad, apical part hardly as long as in *A. disjunctus* and *A. costalis*, but venation about the same; the discal cell is hardly as long as the pedicel. Lower median only slightly fractured at base of fork 5; in the hind wings apical cells as in the fore wings.

Expanse 26 mm.

From Pinnacle Mt., Fulton Co., N. Y., 15th September (Alexander). It has shorter legs than *A. disjunctus* or *A. costalis*.

***Anisogamus disjunctus*, n. sp. (Fig. 22).**

Yellowish; darker on head between ocelli and antennæ; mostly yellowish hair on head and prothorax, some black before base of wings; abdomen dark; wings nearly uniform pale yellowish, no markings, but a white hyaline spot on thyridium and also on arculus, membrane faintly roughened, clothed with sparse, fine, pale hair. Maxillary palpi with second and third joints in male subequal, each as long as space between eyes; in female palpi short, last joint not as long as basal joint of antennæ, fourth about one half of fifth, third about three-fourths of fifth joint, second hardly as long as third. Mesothoracic strips quite long, rather broader behind; posterior warts of vertex transversely elliptical and rather small. Legs with black spines and pale spurs, 1, 3, 4. Fore wings moderately long, rounded at tip; radius strongly bent at base of stigma, discal cell a little longer than pedicel, fork 1 its width back on discal cell, fork 3 a little back of anastomosis, its base not very broad, but not acute, lower median much disjointed at base of fork 5, in hind wings the apical cells are similar to those of fore wings, but fork 3 is more acute at base.

In both sexes the cheeks show a little blunt tubercle below.

Expanse 26 mm.

From Bon Accord, British Columbia, May and June (Russell).

(To be continued).

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BY NATHAN BANKS, EAST FALLS CHURCH, VA.

(Continued from p. 156.)

RYACOPHILIDÆ.

Rhyacophila bifila, n. sp. (Figs. 53, 56.)

Female: Related to *R. coloradensis*, the female appendages on the same plan, but both upper and lower pieces are more slender. Black, with black and gray or whitish hairs; palpi dark brown; antennæ brown, annulate with pale. Wings dark brown, densely irrorate with pale; the costal area mostly pale, stigma long and dark, outer margin with pale spots between the veins; in hind wings the stigma is also very long and dark; forks 1 and 2 equal in length, fork 3 reaching more than one-half way on fork 4.

Expanse 21 mm.

From Vernon, British Columbia, August (Bryant).

Rhyacophila acropedes, n. sp. (Fig. 39.)

Blackish, with black bristles and golden hair; palpi pale; posterior warts pale; antennæ yellowish brown; thorax with two strips of golden hair; legs pale, basal part of tibia I and II to middle spurs dark, basal parts of all tarsi dark; spurs blackish, Wings yellowish brown, darker near tip, mostly unmarked, but around apical margin are dark spots at ends of veins and pale spots between them; thyridial spot hyaline white; base of stigma dark; in hind wings, which are gray, the stigma is wholly dark. In fore wings fork 2 is a little longer than fork 1, fork 3 hardly one-half as long as fork 2, fork 4 with base nearly opposite fork 1; discal fork not before fork of median vein.

Expanse 20 mm.

From Deer Creek, Provo Canyon, Utah, 21 Aug. (Spalding).

Rhyacophila bipartita, n. sp. (Fig. 54.)

Palpi brown, paler on base; antennæ pale, annulate with brown; head and thorax with pale golden hair; legs pale, darker on tarsi. Wings pale brownish, with faint darker brown transverse marks, on stigma the marks are very distinct, also dark marks along cubitus, and at ends of veins; hind wings yellowish brown, the

stigma dark; fork 2 in fore wings plainly longer than fork 1; fork 3 about one-half way back on fork 4.

Expanse 20 mm.

From Banff, Canada, 30 Aug. (Sanson).

Glossosoma penitus, n. sp. (Figs. 16, 19.)

Black; basal part of antennæ pale; legs pale, spurs dark, vertex and thorax with yellowish gray hair; wings dark brown, with black hairs and dark brown fringe; a large corneous, black patch over basal anal area; hind wings with dense black costal fringe. In fore wings fork 3 reaches back as far as fork 2, not stalked, fork 4 about as long as its pedicel; in hind wings fork 3 is longer than its pedicel.

Expanse 12 mm.

From Peachland, British Columbia, 21 July (Wallis).

Agapetus malleatus, n. sp. (Fig. 57.)

Black; the tips of coxae and bases of femora yellow, and basal part of tibia somewhat yellowish; head and thorax with yellowish hair; in fore wings fork 3 is very long, about twice as long as fork 4, fork 5 is long, widely divergent, reaching almost back to base of discal cell; in hind wings forks 2 and 3 are equal in size. Male has the lower appendage with broad tip, reaching beyond the upper piece, the latter very broad with acute process at lower tip; the process of sixth ventral segment short and blunt.

Expanse 11 mm.

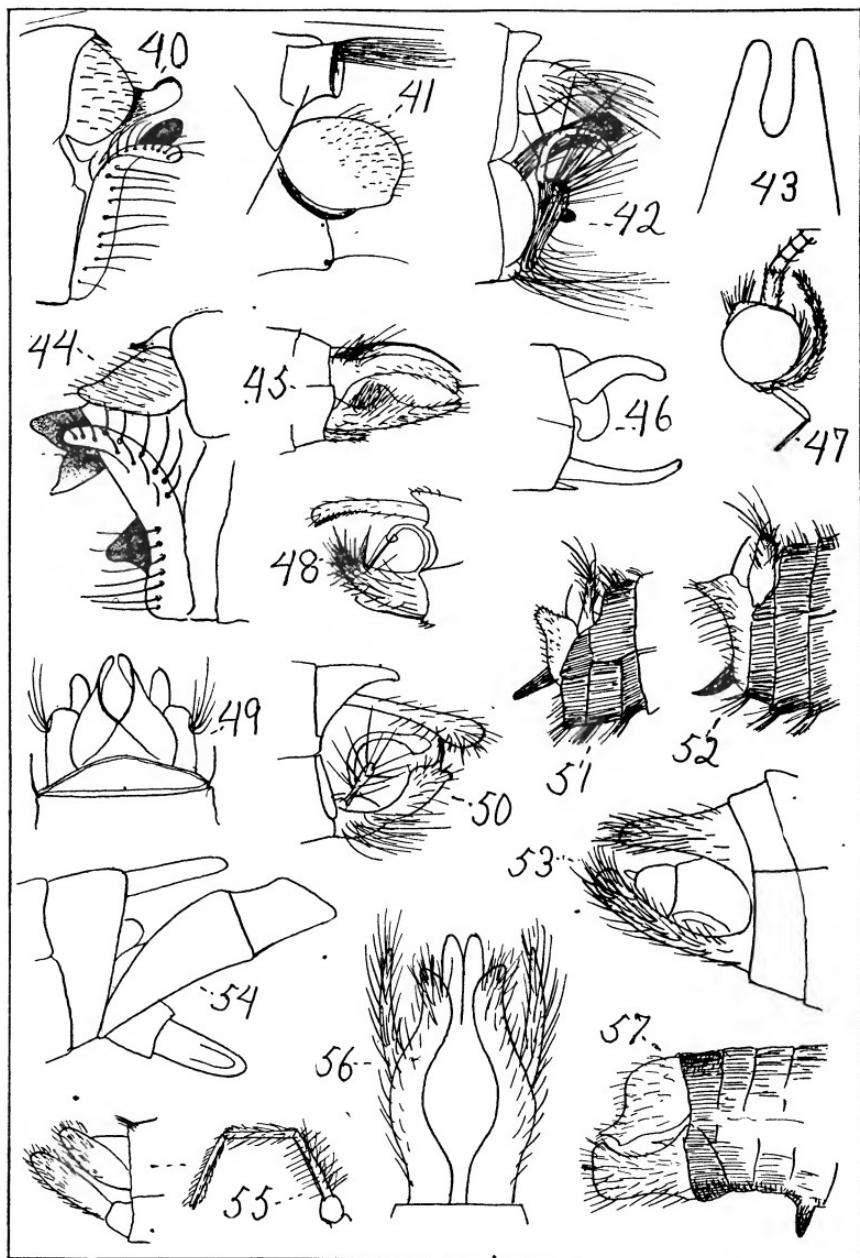
From Switzer's Camp, San Gabriel Mts., Calif., 3,000 ft., 17 June (Grinnell).

Paragapetus, new gen.

Similar to *Agapetus*; venation of front wings about the same, but fork 3 (in type species) is not longer than fork 4, and so does not reach as far forward. In hind wings the venation is similar to that of fore wings, but no fork 4; fork 1 is present and reaches back to discal cell; fork 2 also back to cell.

Paragapetus moestus, n. sp. (Figs. 18, 20, 23.)

Palpi black; antennæ dark, annulate with pale, head brown, white hair on the anterior part of vertex, brown hair on warts; abdomen dull black, genitalia yellowish, legs yellowish, tips of



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tibiæ darker above and tarsi also darker. Wings black, with some scattered yellow hair, the principal marks being three costal spots of yellow, and three on hind margin, one at arculus, one beyond, and one before it; in disc various faint markings, transverse; anastomosis hyaline white, hyaline forked, mark on fork of median vein; hind wings gray, with gray fringe.

Expanse 8 mm.

From Black Mt., North Fork Swannanoa River, N. Car., May.

HYDROPSYCHIDÆ.

In the classification of this family great importance has been placed on the presence of ocelli, and of three spurs on the anterior tibia. Since both of these characters are common in the Rhyacophilidæ, the ancestors of the Hydropsychidæ, I think they are not of such great importance, and as ancestral characters are liable to break out in various places in the Hydropsychidæ. To use the two little appendages at the tip of the female abdomen would also produce false alliances. I have therefore below used a new character as of prime importance; one that is easy of application:

1. Fork 5 of fore wings subequal in length to fork 4; palpal joint 2 about as long as 3 or 4; inferior male appendages two-jointed, usually slender; penis often long and prominent.....2
Fork 5 of fore wings much longer than fork 4 (or 4 absent); palpal joint 3 or 4 usually much longer than 2.....3
2. Hind wings broad, with a closed discal cell; fork 1 in fore wings: no warts in pits of mesonotum; tip of female abdomen not with two little appendages.....*Hydropsychini*.
Hind wings narrow, no closed discal cell; fork 1 lacking in both wings; fifth palpal joint not nearly as long as others united; in female mid-tibiæ and tarsi dilated.....*Psychomyini*.
3. No warts in pits of mesonotum; ocelli present; spurs 2, 4, 4, mid-tibiæ and tarsi of female not dilated.....*Philopotamini*.
A small wart in a pit each side on mesonotum; spurs 3, 4, 4; no ocelli; mid-tibiæ and tarsi of female dilated (at least a little).....*Polycentropini*.

The *Hydropsychini* will include *Hydropsyche*, *Hydropsychodes*, *Arctopsyche*, *Diplectrona*, *Rhyacophylax*, *Smicridea*, *Potamyia*,

Hydromanicus, *Antarctopsyche*, *Symphitopsyche* and *Stenopsyche*. This latter genus has been placed in the Philopotamidae since it has ocelli, but is more allied to *Hydropsyche* by all other characters.

The *Psychomyini* will include, besides the usual genera, *Ecnomus*; it was also placed here by MacLachlan. *Tinodes* is removed to the next tribe.

The *Polycentropini*, besides the usual genera, includes *Tinodes*; this move is also warranted by the structure of the male genitalia.

The *Philopotamini* has the usual genera, as placed by Dr. Ulmer, but without *Stenopsyche*.

(To be continued.)

REPORT ON A COLLECTION OF JAPANESE CRANE-FLIES (*TIPULIDÆ*, *DIPTERA*).

BY CHARLES P. ALEXANDER, ITHACA, N. Y.

(Continued from p. 164.)

Genus: *Tipula* Linnaeus.

Key to the Japanese Tipulæ.

1. Large species (over 30 mm. in length) 2
- Smaller species (less than 25 mm. in length) 4
2. Wings ochre-brown, the cross-veins darker, the stigma bright yellow [abdomen ochraceous-brown, the sternum paler] *præpotens* Wied (1)
Wings not ochre-brown with a yellow stigma 3
3. Abdominal tergites with the apices brown; hypopygium pale dull fulvous brown, thoracic dorsum blackish with two rusty lines *mikado* Westw. (2)
Abdomen with three dorsal longitudinal stripes, the median one indistinct on the basal segments *coquilletti* End.
4. Wings hyaline or subhyaline, with the costal region darker .. 5
Wings either subhyaline without a dark costal border, or else variegated hyaline, gray and brown 6
5. Thoracic notum yellowish; abdomen without a distinct stripe on either side *yamata*, sp. n.

1 *Præpotens* Wiedemann; *Aussercur. Zweifl. Ins.*, vol. 1, pp. 40, 41 (1828).

2 *Mikado* Westwood; *Trans. Ent. Soc. Lond.*, for 1876, p. 504.

AMERICAN TRICHOPTERA—NOTES AND DESCRIPTIONS.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

(Continued from p. 205.)

Hydropsyche partita, n. sp. (Figs. 58-59.)

Black; head and thorax with grayish white hair; palpi nearly black; antennæ yellow, with spiral black line; abdomen black above, pale beneath; legs pale yellow, anterior femora rather darker. Wings brown, densely irrorate with whitish, nearly all over, the apical part very plainly so, a longer pale mark on hind margin before arculus; hind wings gray, darker on costal tip. Fork 1 longer than pedicel, fork 2 extends a little way on discal cell, fork 3 with short pedicel, median cross-vein its length out on median cell; in hind wing fork 1 is very short, fork 2 a long distance on discal cell; male with eyes wide apart, not enlarged.

Expanse 23 mm.

From Switzer's Camp, San Gabriel Mts., June, Mt. Wilson, 10 Aug., and Pasadena, May, all California (Grinell); Pecos, New Mexico, July, Aug., and Vineyard, Utah, July (Spalding).

Hydropsyche venularis, n. sp. (Fig. 62.)

Black; head and thorax with whitish hair; palpi very dark; antennæ yellow, annulate with brown; legs pale yellow. Wings pale, the cubitus heavily bordered with dark brown or black, anal also bordered, a large, elongate streak near stigma, sometimes broken by pale spots, a black spot at end of first apical vein, apical part of wing often infuscate, elsewhere dark spots, often along veins, and some patches of gray hair, all marks tend to be longitudinal; hind wings gray, tip darker. Eyes of male large, approximate. Venation as in *H. scalaris*. Male superior plate with minute emargination, the second part of lower appendage very short and broad, with bifid tip.

Expanse 22 mm.

From Washington, D. C.; Great Falls, Va.; Dane Co., Wisc.; St. Louis, Mo., June to Sept. I had thought this might be *H. reciproca (indecisa)*, but that species is near *H. scalaris*.

July, 1914

Hydropsyche slossonæ, var. *recurvata*, n. var. (Fig. 73).

Very similar to *slossonæ* in appearance and structure, the genitalia of male on same plan, the penis having practically the same structure, but the superior plate has only very short processes, instead of the long ones of true *slossonæ*.

From Go Home Bay, Georgian Bay, Ont. (Walker).

Diplectrona californica, n. sp. (Fig. 63).

Head black, with some yellowish hair; palpi brown; antennæ brown, annulate with pale, strongly crenate beneath; legs pale yellowish. Wings brown; quite broad; stigmal area swollen below in both wings, fork 1 but little longer than pedicel, fork 3 longer than pedicel, fork 4 reaching far back, before thyridial cross-vein; in hind wings fork 1 almost reaches to the discal cell, fork 3 hardly longer than 1, in both wings discal cell is over three times as long as broad.

Expanse 10 mm.

From Claremont, Calif. (Baker).

Psychomyia diversa, n. sp. (Fig. 64).

Black; palpi brown; antennæ dark, faintly annulate with pale, black hair on face, brown on warts and some yellowish on front of vertex, thorax with black hair; wings black, especially dark along the costa; no marks, some yellowish hair scattered through the black; femora pale yellowish, in the male, tibia and tarsi dark or nearly black, in the female, pale, and in the female the wings are generally less dark than in the male; male genitalia pale, the upper lateral pieces are longer and not as broad as in *P. canadensis*; in fore wings the tip of the discal cell is oblique and the fork 2 reaches one-half way back on the cell, fork 3 begins beyond fork 4.

Expanse 10 mm.

From Black Mt., north fork of the Swannanoa River, N. Car., May.

Philopotamus.

Fork 1 very short; hind tibiæ not more hairy than rest of legs; tip of female abdomen does not form a long ovipositor. The genitalia of our two species (*distinctus* and *americanus*) are figured.

Dolophilus.

Fork 1 reaches to discal cell; hind tibiæ of male very hairy; in female the tip of abdomen forms a long ovipositor; in our species the discal cell is not angulate above.

I have two species of this genus as defined above; the characters used to distinguish the European species from *Philopotamus* do not apply to our forms.

Dolophilus major, n. sp. (Fig. 66).

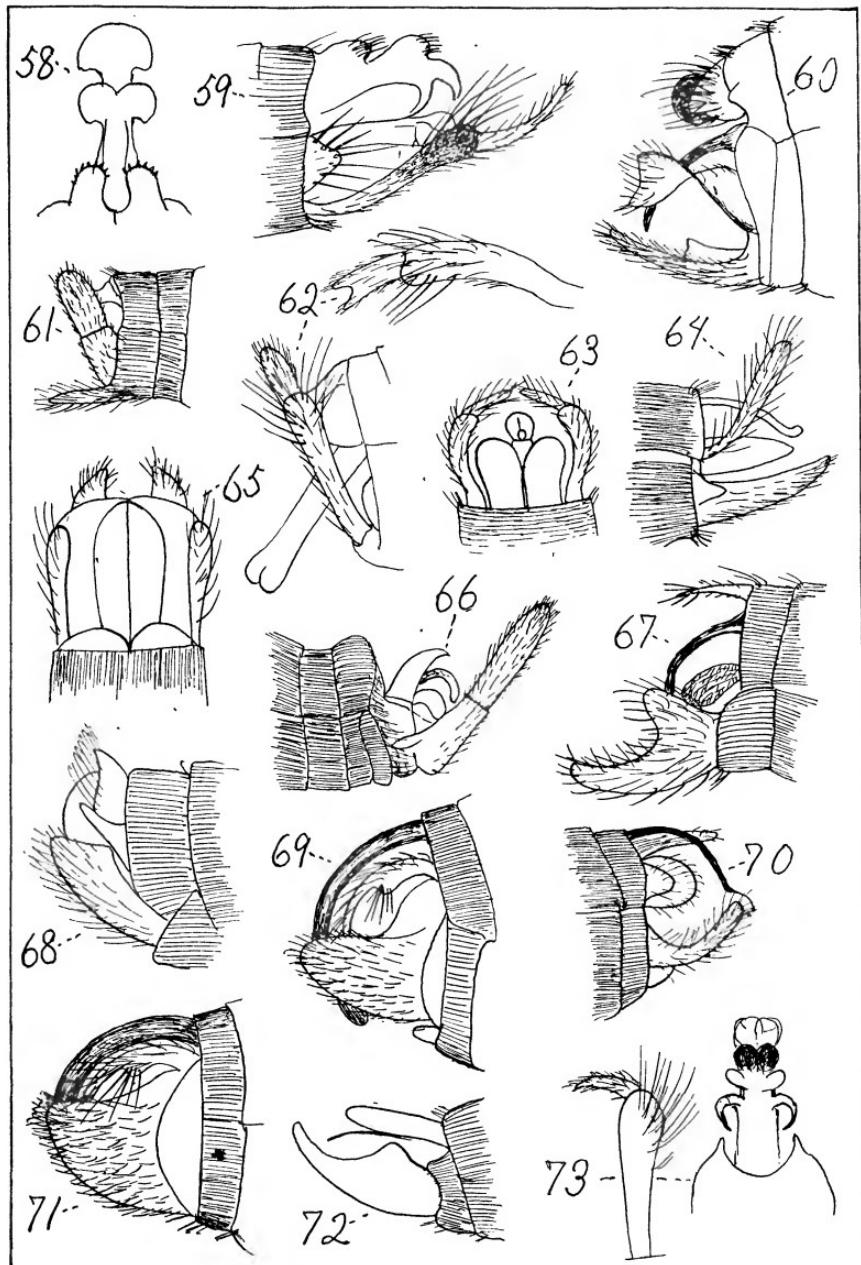
Black, with black and golden-yellow hair; golden hair on front of vertex and base of thorax; palpi brown, antennæ dark, annulate with black, coxa and femora rather dark, rest of legs paler; abdomen black; wings black; fore wing beautifully spotted with golden hair, spots rather small, and mostly subequal in size and situate in the cells, each apical cell with four to ten of them, all over wings; hind wings blackish. Wings long, fork 1 reaches to the discal cell, fork 2 is its width on discal cell, fork 4 a little before fork 3, both long, discal cell nearly three times as long as broad; hind wings with forks 1 and 2 very narrow, as long as in the fore wings.

Expanse 22 mm.

From Black Mt., north fork of the Swannanoa River, N. Car., May. I have no female, and its large size seems out of place in this genus, but the genitalia and long fork 1 will not fit in *Philopotamus*.

Dolophilus breviusculus, n. sp. (Fig. 61).

Face dark; antennæ brown, annulate with yellowish; palpi brown; gray hair between antennæ, and on vertex and thorax, a tuft of black hair near each eye; abdomen brownish; legs yellowish, brownish on tarsi; hind tibiæ with much long pale hair. Wings dark, densely irrorate with golden, a large golden spot before and one beyond stigma, costal area interrupted once with golden; the golden on wing is so dense a reticulation that the dark appears to be broken into many little rectangles; hind wings gray, blackish at tip. Fork 1 reaches to discal cell in both wings, in fore wings forks 3 and 4 subequal, in hind wing fork 3 is much longer than pedicel; the third joint of maxillary palpi much longer than fourth; in female there is a long yellowish ovipositor.



Expanse 12 mm.

From Coy Glen, Ithaca, N. Y., July, and Black Mt., north fork Swannanoa River, N. Car., May.

Plectrocnemia canadensis Bks. (Fig. 37).

My *Polycentropus canadensis* must be referred to *Plectrocnemia*, unless a new genus is made for these small forms. The female has the mid legs with dilated tibia and tarsi, but fork 1 is present in both wings, and discal cell closed in both wings. In fore wings fork 1 is as long as its pedicel, fork 2 back to discal cell, fork 3 with short pedicel, fork 4 back as far as fork 2. In hind wings fork 1 is about as long as pedicel, fork 2 reaches to cell. The male genitalia are figured. It occurs in many places in Eastern States.

Plectrocnemia cinereus Hagen. (Figs. 25, 26).

This is a larger species than *P. canadensis*, but the male genitalia, which are figured, are similar.

Plectrocnemia adironica n. sp. (Fig. 60).

Palpi brownish; antennae pale, broadly annulate with brown; vertex with gray hair in middle, black hair on sides; whitish hair on thorax; abdomen black above, yellowish beneath, legs pale yellowish. Wings gray, with blackish marks along costa and cubitus; blackish spots at end of veins, yellowish between them, rest of wing with pale brown areas, mostly with yellowish hair; hind wings pale, darker at tip. In fore wings no fork 1, fork 2 reaches a little way on discal; fork 3 with short pedicel, fork 4 hardly longer, not as far back as fork 2, fork 5 broad near base; in hind wings fork 1 is nearly as long as its pedicel, fork 2 back on cell, fork 5 very broad; the male genitalia have a rather long median ventral plate.

Expanse 20 mm.

From Axton, Adirondack Mts., N.Y., 12-22 June (MacGillivray). The absence of fork 1 in the fore wings makes its generic position rather doubtful; if the loss is accidental, it is a *Plectrocnemia*.

Phylocentropus vestitus Hagen. (Fig. 35).

I cannot see any difference in the male genitalia between the large spring specimens and the small autumn specimens, both of

which occur here. I have one specimen in which fork 2 is stalked in all four wings, a very unusual variation, as fork 2 is normally the most constant of all the forks. I figure the male genitalia.

Neureclipsis signatus Banks. (Fig. 72).

My *Polycentropus signatus* belongs to this genus, I figure the male genitalia.

Holocentropus interruptus n. sp. (Fig. 71).

Brown, with white and gray hair; palpi pale yellowish; face with dark brown hair, white hair on vertex and thorax; antennæ yellowish, annulate with brown; legs pale yellow. Wings brownish, with many spots and dots of whitish hair, the costal area is interrupted three times with white, a white mark over stigma, beyond are white spots between ends of veins, larger spots on basal middle region, elsewhere mostly small, but often connected, fringe black at ends of the veins, hyaline marks not noticeable. Fork 1 is shorter than pedicel, sometimes only one-half as long, fork 3 is twice as long as its pedicel. Lower appendage of male is broader at base than in *H. flavus*. A slender appendage on each side of body like *Diplectrona*.

Expanse 17 mm.

From Hampton, N.H., June (Shaw); Dane Co., Wisc., July (Vorhies); and Squam Lake, N.H., July (Allen).

Holocentropus orotus n. sp. (Fig. 69).

Palpi brown; antennæ yellowish; face blackish, vertex with white hair in middle, black on sides, thorax white haired; abdomen brown, yellowish beneath; legs yellowish, tarsi darker. Wings brown, with some white spots, three in the costal area (one each side of stigma), around the tip are white spots between veins, and a few in middle of wing, but not as numerous as in *H. interruptus*; hind wings gray, with blackish fringe. Fore wings with discal cell about equal to the pedicel, fork 1 very short, fork 3 as long as pedicel, fork 4 reaches only a little before fork 3. Genitalia similar to *H. interruptus*, but the lower appendages are not as broad, and their upper tips are produced inward so that they touch each other.

Expanse 16 mm.

From Clear Creek and Chimney Gulch, Golden, Colo. (Oslar).

Holocentropus longus n. sp. (Figs. 65, 68).

Palpi pale, dark on last joint; face dark, with black bristles above; vertex black with white hair; antennæ yellowish, annulate with brown; thorax with white hair; legs yellowish; wings brown, irregularly spotted with white, four white marks on costal area before stigma, spots between veins on margin, and many elsewhere, often connected; hyaline marks not distinct. The fore wings are longer than usual, fork 5 with sides parallel for most of its length, in type fork 1 is a mere rudiment at margin, but in another specimen (♀) it is longer than pedicel, in this female there is a short fork 1 in one hind wing.

Expanse 20 mm.

From Framingham, Mass., June (Frost), and Digby, Nova Scotia (Russell), June.

Polycentropus centralis n. sp. (Fig. 67).

Palpi yellowish; antennæ pale, annulate with dark; face brown, vertex with yellow hair in middle, black by eyes, thorax with golden hair, abdomen brown above, yellowish below; legs yellow. Wings dark brown, rather densely spotted with patches of yellow hair; anal and cubital veins more heavily black than others; hind wings gray, blackish at tips; fork 1 about as long as pedicel, venation otherwise like *P. confusus*. Size, rather smaller than *P. confusus*, and lower male appendages of different shape.

From St. Louis, Mo., June.

Polycentropus confusus Hagen. (Fig. 70).

This is common in Northern States; the male genitalia are figured.

(To be continued.)

BOOK REVIEWS.

A TEXTBOOK OF MEDICAL ENTOMOLOGY. By Walter Scott Patton, M.B. (Edin.), I.M.S. and Francis William Cragg, M.D. (Edin.), I.M.S., London, Madras and Calcutta, 1913.

The science of medical entomology, although of very recent origin, has developed so rapidly within the past decade and the

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AMERICAN TRICHOPTERA—NOTES AND DESCRIPTIONS.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

(Continued from p. 258.)

LEPTOCERIDÆ.

Molanna flavicornis, n. sp. (Fig. 46).

Body black, including thorax above, head and thorax clothed with whitish gray hair, basal joint of antennæ dark, beyond wholly pale yellowish (in both sexes); palpi pale, legs pale yellowish, more or less infuscated on femora. Wings yellowish gray. Venation similar to *M. uniophila*, alike in both sexes, venation pale; in fore-wing the cubitus united to the median at a rather obtuse angle, but separates at a very acute angle, as in other species; in the hind wings fork 2 has diverging sides.

Expanse 27 mm.

From Husavick, Man., July, and Winnipeg, Man., May, (Wallis).

Triænodes dentata, n. sp. (Fig 45).

Yellowish gray, head and basal joint of antennæ densely clothed with long yellowish hair; antennæ pale, joints narrowly dark at tips, legs pale. Wings gray, with much gray and yellowish hair, near outer margin there is much black hair, the outer fringe mostly black, deep black at outer angle, posterior fringe gray, a black spot at the arculus, and another about half way from it to base; hind wings yellowish gray, with gray fringe, venation in both pairs pale; costa of fore wings (in ♂) densely hairy. Venation as in *T. ignita*, but the fork 1 is still shorter.

Expanse 18 mm.

From Johnstown, N. Y., June (Alexander), and Hampton, N. H., July (Shaw).

Leptocella stigmatica, n. sp. (Fig. 48).

Face pale, vertex dark with yellowish or gray hair; basal joint of antennæ brown, rest with pale on basal part of the joints, gradually darker beyond; palpi pale; thorax brown, with short yellowish white hair; the abdomen and legs yellowish. Wings gray, in male a large dark brown spot on the stigmal region back to the radial sector, the anastomosis dark-margined, and veins elsewhere faintly dark-margined, fringe black on outer margin; hind wings gray, with gray fringe, black at upper tip. Fore wings very slender, the apical cells short, fork 1 longer than pedicel, fork 3 reaches nearly to the anastomosis, discal cell longer than second apical, not much swollen above; hind wings very broad, basal venation can be traced in a strong light, similar to that of *L. exquisita*. Lower male appendage with blunt tip.

Expanse 27 mm.

From Jemez Mts., New Mexico, June and July (Woodgate).

Leptocella intervena, n. sp. (Figs 15, 50).

Pale yellowish, with white hair; antennæ rather broadly-annulate with dark brown. Fore wings white, in the apical part there are short dark streaks in the cells not touching the veins, these streaks form incomplete bands across the wing, other dark marks along the anal margin; a few black streaks in the middle of wing, but not so distinct as in apical part of wing.

Expanse 21 mm.

From Zavalla Co., Nueces River, Texas, 26 and 27 April (Hunter and Pratt) at light. Type in National Museum.

Ocetina interjecta, n. sp. (Figs. 2, 5).

Face yellow, vertex dark, palpi and antennæ pale, latter with tips of joints narrowly black; thorax brown; abdomen pale brown, yellowish near tip; legs pale yellow. Wings gray, veins darker, a long dark cloud near the stigma; hind wings gray, with darker gray fringe. Fore wings with costal margin much curved near tip, fork 1 reaching to discal cell, veinlets of anastomosis much disjointed; hind wings with fork 1 very short, fork 3 twice as long, and fork 5 reaching nearly one-half way to base.

Expanse 14 mm.

From Go Home Bay, Georgian Bay, Ont., 23 Aug. (Walker).

Leptocerus angustus, n. sp. (Fig. 40).

Body dark, head with gray hair; palpi black, with gray hair. Basal joint of antennae yellowish brown, rest dark, extreme bases of joints whitish; legs pale. Wings gray, with many black hairs near tip, a white point each side of dark stigma, and another white spot at arculus, outer fringe interruptedly dark and white, a long black streak on margin beyond arculus; hind wings gray. Fore wings with fork 3 reaching before fork 1, anastomosis with upper vein disjointed from others, which are nearly interstitial, discal cell reaching fully twice its width before thyridial cell.

Expanse 20 mm.

From Go Home Bay, Georgian Bay, Ont., 1 Aug. (Walker).

Leptocerus retractus, n. sp. (Fig. 41).

Gray; face yellowish, with white hair; palpi dark gray; vertex dark brown; abdomen pale yellowish, darker at tip; legs pale, but tibiae rather gray. Wings gray, with yellowish brown hairs, hyaline dots near base of discal cell, and middle part of costal area hyaline, the median and anal veins for some distance narrowly lined with hyaline. Wings not very long; fore wings with discal cell very long, narrowed near tip, the veins of anastomosis much disjointed and oblique; fork 1 twice as long as pedicel, the double fork (of female) barely longer than fork 1. In hind wings the first and third forks about equal.

Expanse 16 mm.

From Muskoka River, Ont., 30 June, and Go Home Bay, Ont., 8 Aug. (Walker).

Leptocerus inornatus, n. sp. (Fig. 42).

Yellowish brown, white hair on face; palpi gray; antennae yellowish, narrowly annulate with brown; mesonotum dark brown; abdomen yellowish, brown at tip; legs yellowish, fore tarsi white, plainly annulate with brown, mid-tarsi less distinctly marked, hind tarsi all pale. Wings brownish, with brown veins, no marks, clothed with fine white and gray hair. In fore wings fork 1 has a pedicel about as long as fork, fork 3 plainly longer than its pedicel, end of discal cell much beyond the median cross-veins.

Expanse 23 mm.

From Victoria, Texas, 23 March (Mitchell). Type in National Museum.

Leptocerus futilis, n. sp. (Figs. 44, 49).

Body black, head with white hair; palpi dark, with white hair, basal joint of antennæ dark, rest whitish with dark tips to joints; thorax with white stripes in front, and tufts over base of wings; legs pale. Wings dark gray, veins dark, surface clothed with very short yellowish hair, a pale spot at arculus; fork 3 extends more basad than fork 1; the three cross-veins of anastomosis widely disjointed; discal cell extends hardly its width before thyridial cell.

Expanse 21 mm.

From Go Home Bay, Ont., 11 July (Walker).

CALAMOCERATIDÆ.

Psiloneura, n. gen.

In both wings forks 1, 2, 3, 5, the discal cell is closed, in fore wings a cross-vein from base of fork 1 (or before) to the radius; discal cell moderately short; spurs 1, 2, 4 all very short; antennæ wide apart at base; maxillary palpi with joint 2 much longer than any others.

Type.—*P. mœsta*, n. sp.

Philoneura mœsta, n. sp. (Fig. 12).

Brown; palpi brown, face with few yellow hairs; antennæ dark brown; vertex with golden and black hair; thorax blackish near base of wings; abdomen black; legs yellowish; wings grayish brown, with very short yellowish hair; face broad, antennæ wide apart, about two-thirds as long as the fore wings, venation as figured, the corneous dot in fork 2 is one-fourth the way from base, instead of near base as in most species. In fore wings fork 1 extends two-thirds of way back on discal cell, the cross-veins before base of fork up to radius.

Expanse 22 mm.

From Cambridge, Mass., Sept.

Astoplectron, n. gen.

Type.—*Heteroplectron boreale* Prov. Similar to *Heteroplectron*, but no fork 4 in fore wings of either sex, and in ♂ no fork 3, and in hind wings the discal cell is closed. In hind wings forks 1, 2,

3, 5. In fore wings fork 1 reaches far back on cell, fork 3 hardly as long as fork 2; there is no cross-vein from radial sector to radius, spurs 2, 4, 4; basal joint of the antennæ about as long as the vertex.

Astoplectron connexa, n. sp. (Figs. 24, 55).

Similar in appearance to *A. boreale* Prov.; body and wings brown, without markings, legs paler; basal joint of antennæ dark. Differs from *A. boreale* in that the vein at upper side of fork 1 is angularly bent up toward radius, and connected to radius by a cross-vein, this just alike in both fore wings; in three males of *A. boreale* there this vein is straight; besides the proportions of the cells are slightly different. The male appendages are a little shorter than in *A. boreale*.

Expanse 18 mm.

From Great Falls, Va., 12 June.

SERICOSTOMATIDÆ.

Olemira costalis, n. sp. (Fig. 34).

Brown; palpi covered with long, dense, black hair; antennæ brown, basal joint black beneath; vertex pale in middle, vertex and thorax with some yellow hair; legs yellowish; wings gray, nearly uniformly coloured, fringes darker. In male the costal area is swollen and reflexed over the wing, just as in *O. americana*, except that this reflexed part is only about one-half as wide as in *O. americana*; venation as in that species, but in the hind wings the discal cell is a little longer; genitalia similar to that of *O. americana*.

Expanse 15 mm.

From Woodworth's Lake, Fulton Co., N. Y., 19 August (Alexander). *O. americana*, besides the type locality, I have seen it from Riverside, Mass., and Falls Church, Va.

Micrasema falcata, n. sp. (Fig. 52).

Brown; palpi yellowish; antennæ dark at base; head and thorax with gray hair; abdomen black, with white hair; legs pale, with white hair. Wings brown, with scattered yellowish and black hairs; venation similar to that of *M. charonis*; discal and median cross-veins interstitial, fork 1 reaching back on discal cell further

than in *M. charonis*, and fork 2 has a very much longer pedicel, longer than the discal cell.

Expanse 10 mm.

From Great Falls, Va., 12 May.

***Micrasema charonis*, n. sp.** (Figs. 3, 47, 51).

Jet black; head and thorax with black hair; legs rather brown; abdomen with rather long, erect hairs above; spurs very short, not as long as width of the joint. Venation as figured; maxillary palpi long, slender, upcurved, reaching to tip of basal joint of antennæ, sparsely hairy.

Expanse 10 mm.

From Black Mts., North Fork Swannanoa River, N. Car., May. The first record of this genus from the United States.

***Mormomyia vernalis* Bks.** (Figs. 1, 4, 28).

I have this species from Tryon, N. Car. Among the original series are two specimens with slightly longer wings, and both have fork 4 well developed in each fore wing; both are males, and their genitalia do not appear to differ from typical specimens.

***Schizopelex hesperus*, n. sp.** (Fig. 10).

♀.—Brown; vertex and thorax with white hair above; antennæ brown; wings brown, densely and evenly clothed with short golden hair, no markings; hind wings gray, with sparse golden hair, abdomen brown; front and mid legs brownish, hind legs yellowish. Venation similar to *S. lobata*, but fork 2 is acute at tip.

Expanse 28 mm.

From Vinyard, Utah, 10 July. Differs from *S. lobata* in the white hair of head and thorax.

EXPLANATION OF PLATES.

- Fig. 1.—*Mormomyia vernalis*, hind wing.
- Fig. 2.—*Œcetina interjecta*, fore wing.
- Fig. 3.—*Micrasema charonis*, wings.
- Fig. 4.—*Mormomyia vernalis*, head.
- Fig. 5.—*Œcetina interjecta*, genitalia.
- Fig. 6.—*Stenophylax hesperus*, genitalia above.
- Fig. 7.—*Anisogamus infernalis*, genitalia.

- Fig. 8.—*Limnephilus spinatus*, genitalia.
Fig. 9.—*Limnephilus spinatus*, genitalia above.
Fig. 10.—*Schizopelex hesperus*, wings.
Fig. 11.—*Neuronia smithi*, genitalia.
Fig. 12.—*Psiloneura moesta*, wings, palpi.
Fig. 13.—*Limnephilus argenteus*, genitalia.
Fig. 14.—*Limnephilus aequalis*, genitalia.
Fig. 15.—*Leptocella intervena*, fore wing.
Fig. 16.—*Glossosoma penitus*, genitalia.
Fig. 17.—*Limnephilus secludens*, genitalia.
Fig. 18.—*Paragapetus moestus*, fore wing.
Fig. 19.—*Glossosoma penitus*, genitalia, beneath.
Fig. 20.—*Paragapetus moestus*, genitalia.
Fig. 21.—*Stenophylax hesperus*, genitalia.
Fig. 22.—*Anisogamus disjunctus*, genitalia.
Fig. 23.—*Paragapetus moestus*, hind wing.
Fig. 24.—*Astoplectron connexa*, wings.
Fig. 25.—*Plectrocnemia cinerea*, genitalia, above.
Fig. 26.—*Plectrocnemia cinerea*, genitalia.
Fig. 27.—*Limnephilus secludens*, genitalia, behind.
Fig. 28.—*Mormomyia vernalis*, genitalia.
Fig. 29.—*Limnephilus productus*, genitalia, above.
Fig. 30.—*Philopotamus distinctus*, genitalia.
Fig. 31.—*Limnephilus aequalis*, genitalia, above.
Fig. 32.—*Stenophylax flavata*, genitalia, above.
Fig. 33.—*Stenophylax flavata*, genitalia, behind.
Fig. 34.—*Olemira costalis*, genitalia.
Fig. 35.—*Phylocentropus vestitus*, genitalia.
Fig. 36.—*Limnephilus productus*, genitalia.
Fig. 37.—*Plectrocnemia canadensis*, genitalia.
Fig. 38.—*Philopotamus americanus*, genitalia.
Fig. 39.—*Rhyacophila acropedes*, genitalia.
Fig. 40.—*Leptocerus angustus*, genitalia.
Fig. 41.—*Leptocerus retactus*, genitalia.
Fig. 42.—*Leptocerus inornatus*, genitalia.
Fig. 43.—*Rhyacophila bipartita*, ♀ plate below.
Fig. 44.—*Leptocerus futilis*, genitalia.

- Fig. 45.—*Triænodes dentata*, genitalia.
Fig. 46.—*Molanna flavigornis*, genitalia.
Fig. 47.—*Micrasema charonis*, head.
Fig. 48.—*Leptocella stigmatica*, genitalia.
Fig. 49.—*Leptocerus futilis*, genitalia, above.
Fig. 50.—*Leptocella intervena*, genitalia.
Fig. 51.—*Micrasema charonis*, genitalia.
Fig. 52.—*Micrasema falcata*, genitalia.
Fig. 53.—*Rhyacophila bifila*, genitalia, ♀.
Fig. 54.—*Rhyacophila bipartita*, genitalia.
Fig. 55.—*Astroleptocerum connexa*, genitalia, palpus.
Fig. 56.—*Rhyacophila bifila*, ♀, beneath.
Fig. 57.—*Agapetus malleatus*, genitalia.
Fig. 58.—*Hydropsyche partita*, penis.
Fig. 59.—*Hydropsyche partita*, genitalia.
Fig. 60.—*Plectrocnemia adirondica*, genitalia.
Fig. 61.—*Dolophilus breviatus*, genitalia.
Fig. 62.—*Hydropsyche venularis*, genitalia.
Fig. 63.—*Diplectrona californica*, genitalia.
Fig. 64.—*Psychomyia diversa*, genitalia.
Fig. 65.—*Holocentropus longus*, genitalia, above.
Fig. 66.—*Dolophilus major*, genitalia.
Fig. 67.—*Polycentropus centralis*, genitalia.
Fig. 68.—*Holocentropus longus*, genitalia.
Fig. 69.—*Holocentropus orotus*, genitalia.
Fig. 70.—*Polycentropus confusus*, genitalia.
Fig. 71.—*Holocentropus interruptus*, genitalia.
Fig. 72.—*Neureclipsis signatus*, genitalia.
Fig. 73.—*Hydropsyche recurvata*, genitalia.
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OBITUARY.

Mr. Frank E. Moeser, a collector of Lepidoptera and a keen observer of their life histories, died at his home, 239 Guilford St., Buffalo, N.Y., on May 15th, being forty-five years of age. His work among the local Noctuidæ especially, proved of interest, in that material brought to notice by Grote, when the latter was with the Buffalo Society of Natural Sciences, was again collected by him. He is survived by a wife, daughter and son. H. BIRD.